

MODEL : HRP-150-24

## OUTPUT FUNCTION TEST

| NO | TEST ITEM                      | SPECIFICATION                                     | TEST CONDITION                                                      | RESULT                                                 | VERDICT |
|----|--------------------------------|---------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------|---------|
| 1  | RIPPLE & NOISE                 | V1 : 150 mVp-p (Max )                             | I/P : 230VAC<br>O/P : FULL LOAD<br>Ta : 25°C                        | V1 : 59.6 mVp-p (Max )                                 | P       |
| 2  | OUTPUT VOLTAGE<br>ADJUST RANGE | CH1 : 21.6 V ~ 28.8 V                             | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : MIN LOAD<br>Ta : 25°C       | 20.96 V~ 32.09 V/ 230 VAC<br>20.96 V~ 32.09 V/ 115 VAC | P       |
| 3  | OUTPUT VOLTAGE<br>TOLERANCE    | V1 : 1.5 % ~ -1.5 % (Max)                         | I/P : 100 VAC / 264 VAC<br>O/P : FULL/ MIN LOAD<br>Ta : 25°C        | V1 : 0.2 % ~ -0.2 %                                    | P       |
| 4  | LINE REGULATION                | V1 : 0.2 % ~ -0.2 % (Max)                         | I/P : 100 VAC ~ 264 VAC<br>O/P : FULL LOAD<br>Ta : 25°C             | V1 : 0 % ~ 0 %                                         | P       |
| 5  | LOAD REGULATION                | V1 : 0.5 % ~ -0.5 % (Max)                         | I/P : 230 VAC<br>O/P : FULL ~ MIN LOAD<br>Ta : 25°C                 | V1 : 0.18 % ~ -0.18 %                                  | P       |
| 6  | SET UP TIME                    | 230VAC : 3000 ms (Max)<br>115 VAC : 3000 ms (Max) | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C      | 230VAC/ 1199 ms<br>115VAC/ 1199 ms                     | P       |
| 7  | RISE TIME                      | 230VAC : 50 ms (Max)<br>115VAC : 50 ms (Max)      | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C      | 230VAC/ 12 ms<br>115VAC/ 12 ms                         | P       |
| 8  | HOLD UP TIME                   | 230VAC : 16 ms (TYP)<br>115VAC : 16 ms (TYP)      | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C      | 230VAC/ 27 ms<br>115VAC/ 25 ms                         | P       |
| 9  | OVER/UNDERSHOOT<br>TEST        | < ±5%                                             | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                       | TEST : < 5 %                                           | P       |
| 10 | DYNAMIC LOAD                   | V1 : 2400 mVp-p                                   | I/P : 230 VAC<br>O/P : FULL /Min LOAD 90%DUTY/<br>1KHZ<br>Ta : 25°C | 651 mVp-p                                              | P       |

### INPUT FUNCTION TEST

| NO | TEST ITEM                 | SPECIFICATION                                      | TEST CONDITION                                                                                                                                | RESULT                                     | VERDICT |
|----|---------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------|
| 1  | INPUT VOLTAGE RANGE       | 85VAC~264 VAC                                      | I/P : TESTING<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                 | 73 V~264V                                  | P       |
|    |                           |                                                    | I/P :<br>LOW-LINE-3V= 97 V<br>HIGH-LINE+15%=300 V<br>O/P : FULL/MIN LOAD<br>ON : 30 Sec . OFF : 30 Sec 10MIN<br>( AC POWER ON/OFF NO DAMAGE ) | TEST : OK                                  |         |
| 2  | INPUT FREQUENCY RANGE     | 47HZ ~63 HZ<br>NO DAMAGE OSC                       | I/P : 100 VAC ~ 264 VAC<br>O/P : FULL~MIN LOAD<br>Ta : 25°C                                                                                   | TEST : OK                                  | P       |
| 3  | POWER FACTOR              | 0.95 / 230 VAC(TYP)<br>0.99 / 115 VAC(TYP)         | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                | PF= 0.975 / 230 VAC<br>PF= 1 / 115 VAC     | P       |
| 4  | EFFICIENCY                | 87% (TYP)                                          | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                 | 88.5 %                                     | P       |
| 5  | INPUT CURRENT             | 230V/ 1.3 A (TYP)<br>115V/ 2.3 A (TYP)             | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                | I = 0.76 A/ 230 VAC<br>I = 1.51 A/ 115 VAC | P       |
| 6  | INRUSH CURRENT            | 230V/ 70 A (TYP)<br>115V/ 35 A (TYP)<br>COLD START | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                | I = 63 A/ 230 VAC<br>I = 31 A/ 115 VAC     | P       |
| 7  | LEAKAGE CURRENT           | < 1 mA / 240 VAC                                   | I/P : 264 VAC<br>O/P : Min LOAD<br>Ta : 25°C                                                                                                  | L-FG : 0.1 mA<br>N-FG : 0.1 mA             | P       |
| 8  | NO LOAD POWER CONSUMPTION | <0.5W                                              | I/P : 240 VAC<br>O/P : NO LOAD<br>RC+/RC- SHORT<br>Ta : 25°C                                                                                  | 0.25 W                                     | P       |

## PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                                                            | TEST CONDITION                                                | RESULT                                                                                            | VERDICT |
|----|-----------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------|
| 1  | OVER LOAD PROTECTION        | 105 %~ 135 %                                                             | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : TESTING<br>Ta : 25°C  | 122 %/ 230 VAC<br>122 %/ 115 VAC<br>Constant Current Limiting                                     | P       |
| 2  | OVER VOLTAGE PROTECTION     | CH1 : 30 V~ 34.8 V                                                       | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : MIN LOAD<br>Ta : 25°C | 32.5 V/ 230 VAC<br>32.5 V/ 115 VAC<br>Shut down Re- power ON                                      | P       |
| 3  | OVER TEMPERATURE PROTECTION | SPEC :<br>TSW1 : 85 ± 5°C O.T.P.<br>TSW2 : 100 ± 5°C O.T.P.<br>NO DAMAGE | I/P : 230 VAC<br>O/P : FULL LOAD                              | O.T.P. Active<br>Shut down o/p voltage , recovers<br>automatically after temperature<br>goes down | P       |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE                                   | I/P : 264 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                 | NO DAMAGE<br><br>Constant Current Limiting                                                        | P       |

## CONTROL FUNCTION TEST

| NO | TEST ITEM      | SPECIFICATION                                     | TEST CONDITION                                | RESULT                           | VERDICT |
|----|----------------|---------------------------------------------------|-----------------------------------------------|----------------------------------|---------|
| 1  | REMOTE CONTROL | Rc+ / Rc-<br>SHORT : POWER OFF<br>OPEN : POWER ON | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | OK                               | P       |
| 2  | REMOTE SENSE   | >0.3V                                             | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | 0.3V                             | P       |
| 3  | AUX POWER      | 4.6V~5.25V/0.3A<br>RIPPLE=50mV                    | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | 5VSB : 4.939 V<br>RIPPLE : 10 mV | P       |

## ENVIRONMENT TEST

| NO | TEST ITEM                                                         | SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TEST CONDITION                                                     | RESULT                    | VERDICT |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
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| 1  | TEMPERATURE RISE TEST                                             | <div>MODEL : HRPG-150-24</div> <div>1. ROOM AMBIENT BURN-IN : 1.5 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 24.2 °C</div> <div>2. HIGH AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 41 °C</div> <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT<br/>Ta= 24.2 °C</th><th>HIGH AMBIENT<br/>Ta= 41 °C</th></tr><tr><td>1</td><td>LF2</td><td>TR781</td><td>59.8°C</td><td>74.9°C</td></tr><tr><td>2</td><td>BD1</td><td>BD 4A/600V D3SB60</td><td>69.4°C</td><td>84.7°C</td></tr><tr><td>3</td><td>L3</td><td>TF1592</td><td>56.8°C</td><td>74.5°C</td></tr><tr><td>4</td><td>Q1</td><td>IRFP460A 20A/500V</td><td>57.0°C</td><td>72.9°C</td></tr><tr><td>5</td><td>D1</td><td>BYC8-600 8A/600V</td><td>60.9°C</td><td>76.7°C</td></tr><tr><td>6</td><td>C5</td><td>100u/400V 105°C 18*25 KMG</td><td>71.9°C</td><td>89.1°C</td></tr><tr><td>7</td><td>CN2</td><td>85°C (NEAR Q1)</td><td>55.7°C</td><td>71.6°C</td></tr><tr><td>8</td><td>C61</td><td>470u/16V 105°C KY</td><td>81.0°C</td><td>98.6°C</td></tr><tr><td>9</td><td>T2</td><td>TR435-R3</td><td>72.0°C</td><td>88.4°C</td></tr><tr><td>10</td><td>Q3</td><td>2SK3568 12A/500V TO220F</td><td>80.1°C</td><td>97.9°C</td></tr><tr><td>11</td><td>U1</td><td>FAN4801</td><td>81.2°C</td><td>98.6°C</td></tr><tr><td>12</td><td>T1</td><td>TF1589</td><td>81.5°C</td><td>99.2°C</td></tr><tr><td>13</td><td>Q101</td><td>STPS20170C 20A/170V</td><td>78.4°C</td><td>94.3°C</td></tr><tr><td>14</td><td>L100</td><td>TR824</td><td>80.1°C</td><td>96.7°C</td></tr><tr><td>15</td><td>C105</td><td>680u/35V UL10Kh 10*23 ZLH</td><td>59.6°C</td><td>74.6°C</td></tr><tr><td>16</td><td>CN101</td><td>100°C (NEAR Q101)</td><td>77.3°C</td><td>93.1°C</td></tr><tr><td>17</td><td>U900</td><td>TNY275</td><td>82.8°C</td><td>99.9°C</td></tr><tr><td>18</td><td>ZD900</td><td>TVS ST02D-200</td><td>81.8°C</td><td>98.2°C</td></tr><tr><td>19</td><td>T900</td><td>TF1593</td><td>83.4°C</td><td>99.2°C</td></tr><tr><td>20</td><td>C955</td><td>220u/35V UL8Kh 8*11.5 ZLH</td><td>75.7°C</td><td>90.9°C</td></tr></table> |                                                                    |                           | NO      | Position | P/N | ROOM AMBIENT<br>Ta= 24.2 °C | HIGH AMBIENT<br>Ta= 41 °C | 1 | LF2 | TR781 | 59.8°C | 74.9°C | 2 | BD1 | BD 4A/600V D3SB60 | 69.4°C | 84.7°C | 3 | L3 | TF1592 | 56.8°C | 74.5°C | 4 | Q1 | IRFP460A 20A/500V | 57.0°C | 72.9°C | 5 | D1 | BYC8-600 8A/600V | 60.9°C | 76.7°C | 6 | C5 | 100u/400V 105°C 18*25 KMG | 71.9°C | 89.1°C | 7 | CN2 | 85°C (NEAR Q1) | 55.7°C | 71.6°C | 8 | C61 | 470u/16V 105°C KY | 81.0°C | 98.6°C | 9 | T2 | TR435-R3 | 72.0°C | 88.4°C | 10 | Q3 | 2SK3568 12A/500V TO220F | 80.1°C | 97.9°C | 11 | U1 | FAN4801 | 81.2°C | 98.6°C | 12 | T1 | TF1589 | 81.5°C | 99.2°C | 13 | Q101 | STPS20170C 20A/170V | 78.4°C | 94.3°C | 14 | L100 | TR824 | 80.1°C | 96.7°C | 15 | C105 | 680u/35V UL10Kh 10*23 ZLH | 59.6°C | 74.6°C | 16 | CN101 | 100°C (NEAR Q101) | 77.3°C | 93.1°C | 17 | U900 | TNY275 | 82.8°C | 99.9°C | 18 | ZD900 | TVS ST02D-200 | 81.8°C | 98.2°C | 19 | T900 | TF1593 | 83.4°C | 99.2°C | 20 | C955 | 220u/35V UL8Kh 8*11.5 ZLH | 75.7°C | 90.9°C | P |
| NO | Position                                                          | P/N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ROOM AMBIENT<br>Ta= 24.2 °C                                        | HIGH AMBIENT<br>Ta= 41 °C |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 1  | LF2                                                               | TR781                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 59.8°C                                                             | 74.9°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 2  | BD1                                                               | BD 4A/600V D3SB60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 69.4°C                                                             | 84.7°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 3  | L3                                                                | TF1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 56.8°C                                                             | 74.5°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 4  | Q1                                                                | IRFP460A 20A/500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 57.0°C                                                             | 72.9°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 5  | D1                                                                | BYC8-600 8A/600V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 60.9°C                                                             | 76.7°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 6  | C5                                                                | 100u/400V 105°C 18*25 KMG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 71.9°C                                                             | 89.1°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 7  | CN2                                                               | 85°C (NEAR Q1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 55.7°C                                                             | 71.6°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 8  | C61                                                               | 470u/16V 105°C KY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 81.0°C                                                             | 98.6°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 9  | T2                                                                | TR435-R3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 72.0°C                                                             | 88.4°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 10 | Q3                                                                | 2SK3568 12A/500V TO220F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 80.1°C                                                             | 97.9°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 11 | U1                                                                | FAN4801                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 81.2°C                                                             | 98.6°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 12 | T1                                                                | TF1589                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 81.5°C                                                             | 99.2°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 13 | Q101                                                              | STPS20170C 20A/170V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 78.4°C                                                             | 94.3°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 14 | L100                                                              | TR824                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80.1°C                                                             | 96.7°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 15 | C105                                                              | 680u/35V UL10Kh 10*23 ZLH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 59.6°C                                                             | 74.6°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 16 | CN101                                                             | 100°C (NEAR Q101)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 77.3°C                                                             | 93.1°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 17 | U900                                                              | TNY275                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 82.8°C                                                             | 99.9°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 18 | ZD900                                                             | TVS ST02D-200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 81.8°C                                                             | 98.2°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 19 | T900                                                              | TF1593                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 83.4°C                                                             | 99.2°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 20 | C955                                                              | 220u/35V UL8Kh 8*11.5 ZLH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 75.7°C                                                             | 90.9°C                    |         |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I/P : 230 VAC<br>O/P : 120 % LOAD<br>Ta : 25°C                     | TEST : OK                 | P       |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | I/P : 230 VAC<br>O/P : 100 % LOAD<br>Ta= -40 °C                    | TEST : OK                 | P       |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 40 °C<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | I/P : 272 VAC<br>O/P : FULL LOAD<br>Ta= 40 °C<br>HUMIDITY= 95 %R.H | TEST : OK                 | P       |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.04 %(0~50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I/P : 230 VAC<br>O/P : FULL LOAD                                   | ± 0.005 %(0~50°C)         | P       |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |
| 6  | VIBRATION TEST                                                    | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 10min/sweep cycle<br>(4) Acceleration : 5G<br>(5) Test Time : 1 hour in each axis (X.Y.Z)<br>(6) Ta : 25°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    | TEST : OK                 | P       |          |     |                             |                           |   |     |       |        |        |   |     |                   |        |        |   |    |        |        |        |   |    |                   |        |        |   |    |                  |        |        |   |    |                           |        |        |   |     |                |        |        |   |     |                   |        |        |   |    |          |        |        |    |    |                         |        |        |    |    |         |        |        |    |    |        |        |        |    |      |                     |        |        |    |      |       |        |        |    |      |                           |        |        |    |       |                   |        |        |    |      |        |        |        |    |       |               |        |        |    |      |        |        |        |    |      |                           |        |        |   |

## SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                                                            | TEST CONDITION                                                                        | RESULT                                                                 | VERDICT |
|----|----------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P : 3 KVAC/min<br>I/P-FG : 2 KVAC/min<br>O/P-FG : 0.5 KVAC/min     | I/P-O/P : 3.6 KVAC/min<br>I/P-FG : 2.4 KVAC/min<br>O/P-FG : 0.6 KVAC/min<br>Ta : 25°C | I/P-O/P : 3.26 mA<br>I/P-FG : 1.37 mA<br>O/P-FG : 1.98 mA<br>NO DAMAGE | P       |
| 2  | ISOLATION RESISTANCE | I/P-O/P : 500VDC>100MΩ<br>I/P-FG : 500VDC>100MΩ<br>O/P-FG : 500VDC>100MΩ | I/P-O/P : 500 VDC<br>I/P-FG : 500 VDC<br>O/P-FG : 500 VDC<br>Ta : 25°C /70%RH         | I/P-O/P : 26.1 GΩ<br>I/P-FG : 30 GΩ<br>O/P-FG : 30 GΩ<br>NO DAMAGE     | P       |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                                   | 40 A / 2min<br>Ta : 25°C / 70%RH                                                      | 2 mΩ                                                                   | P       |
| 4  | APPROVAL             | TUV : Certificate NO : R50147701<br>UL : File NO : E183223               |                                                                                       |                                                                        | P       |

## E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION                                         | TEST CONDITION                                     | RESULT                        | VERDICT |
|----|---------------------------------------------|-------------------------------------------------------|----------------------------------------------------|-------------------------------|---------|
| 1  | HARMONIC                                    | EN61000-3-2,-3<br>CLASS A                             | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | PASS                          | P       |
| 2  | CONDUCTION                                  | EN55022<br>CLASS B                                    | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab | P       |
| 3  | RADIATION                                   | EN55022<br>CLASS B                                    | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab | P       |
| 4  | E.S.D                                       | EN61000-4-2<br>INDUSTRY<br>AIR : 8KV / Contact : 4KV  | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | CRITERIA A                    | P       |
| 5  | E.F.T                                       | EN61000-4-4<br>INDUSTRY<br>INPUT : 2KV                | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | CRITERIA A                    | P       |
| 6  | SURGE                                       | IEC61000-4-5<br>INDUSTRY<br>L-N : 2KV<br>L,N-PE : 4KV | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | CRITERIA A                    | P       |
| 7  | Test by certified Lab & Test Report Prepare |                                                       |                                                    |                               |         |

## M.T.B.F & LIFE CYCLE CALCULATION

| NO | TEST ITEM                   | SPECIFICATION                                                                                                  | TEST CONDITION                                                                   | RESULT | VERDICT |
|----|-----------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------|---------|
| 1  | CAPACITOR<br>LIFE CYCLE     | HRPG-150-24 : SUPPOSE C105<br>I/P : 230VAC O/P : FULL LOAD Ta= 25 °C<br>I/P : 230VAC O/P : FULL LOAD Ta= 40 °C | IS THE MOST CRITICAL COMPONENT<br>LIFE TIME= 266321 HRS<br>LIFE TIME= 106722 HRS |        | P       |
| 2  | MTBF                        | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE : 213.4K HRS                                          |                                                                                  |        | P       |
| 3  | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure : Above 50,000 hours @ TA 40°C                                         |                                                                                  |        | P       |

## COMPONENT STRESS TEST

| NO | TEST ITEM                                              | SPECIFICATION                                                              | TEST CONDITION                                                                                                                             | RESULT                                               | VERDICT |
|----|--------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---------|
| 1  | Power Transistor<br>( D to S) or (C to E) Peak Voltage | Q 3 Rated<br>2SK4106 12A/500V                                              | I/P : High-Line +3V = 267 V<br>O/P : (1)Full Load Turn on<br>(2) Output Short<br>Ta : 25°C                                                 | (1) 462 V<br>(2) 418 V                               | P       |
| 2  | Diode Peak Voltage                                     | Q101 Rated<br>STPS20170C 20A/170V<br><br>Q103 Rated<br>STPS20170C 20A/170V | I/P : High-Line +3V = 267 V<br>O/P : (1)Full Load Turn on<br>(2)Output Short<br>O/P : (1)Full Load Turn on<br>(2)Output Short<br>Ta : 25°C | (1) 152 V<br>(2) 142 V<br><br>(1) 156 V<br>(2) 160 V | P       |
| 3  | PFC Transistor<br>( D to S) or (C to E) Peak Voltage   | Q1 Rated :<br>IRFP460A 20A/500V                                            | I/P : High-Line +3V = 267 V<br>O/P : (1)Full Load<br>(2) Dynamic Load<br>90%Duty/1KHz<br>Ta : 25°C                                         | (1) 436 V<br>(2) 424 V                               | P       |
| 4  | Input Capacitor Voltage                                | C5 Rated<br>100u/400V 105°C KMG                                            | I/P : High-Line +3V = 267 V<br>O/P : (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Full Load /Min load Change<br>Ta : 25°C  | (1) 375.3 V<br>(2) 375.7 V<br>(3) 375.3 V            | P       |
| 5  | Control IC Voltage Test                                | U 2 Rated<br>FAN4801 : 12V~30V                                             | I/P : High-Line +3V = 267 V<br>O/P : (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Full Load /Min load Change<br>Ta : 25°C  | (1) 15.9 V<br>(2) 14.2 V<br>(3) 15.9 V               | P       |

| DATE      | SAMPLE                     | TEST RESULT | TESTER     | APPROVAL      |
|-----------|----------------------------|-------------|------------|---------------|
| 2008/12/1 | RD SAMPLE                  | PASS        | SANFORD SU | VINCENT TSENG |
| 2009/3/25 | PRODUCT SAMPLE<br>W0812D43 | PASS        | SANFORD SU | VINCENT TSENG |
| 2009/6/16 | PRODUCT SAMPLE<br>W0905A31 | PASS        | SANFORD SU | VINCENT TSENG |

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